

129-58-8-2/16

Refining of the Grain During High Temperature Heating

work hardening is that the grains become finer due to
recrystallisation during further heating.
There are 2 figures, 1 table and 10 references,
7 of which are Soviet, 2 German, 1 English.

ASSOCIATION: TsNII MPS

1. Grains (Metallurgy)--Growth 2. Grains (Metallurgy)--Temperature
factors 3. Aluminum--Crystal structure 4. Aluminum--Temperature
factors

Card 3/3

24(6), 18(3), 18(7) SOV/126-7-2-15/39
AUTHORS: Rauzin, Ya. R. and Mirza, A. N.

TITLE: A Contribution to the Problem Regarding the Nature of the Yield Plateau (K voprosu o prirode ploshchadki tekuchesti)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 7, Nr 2,
pp 259-264 (USSR)

ABSTRACT: The most convincing hypothesis explaining the yield plateau in a stress-deformation curve up to recent times has been the so-called brittle skeleton hypothesis (Refs 1-3) or, as applied to iron and Fe-C alloys, the ternary cementite hypothesis. A number of observations, however, do not fit into this hypothesis. These, as well as observations, which indirectly confirm this hypothesis, did not allow its absolute reliability to be proclaimed. In this work an attempt is made to elucidate the problems involved. The materials for a wider investigation of the cementite skeleton in technically pure iron with an electron microscope, are quoted. A correlation of change in microstructure with that of the yield plateau has been made under various conditions of the iron, which enabled different elongation diagrams to be obtained. The iron investigated had the composition:- 0.04% C, 0.07% Mn, Card 1/5 0.13% Si, 0.012% S, 0.036% P and 0.12% Cu. The iron was

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treated in the following manner:-
1. As received. Hot rolling. Normalising at 900°C in air.
Original grain size - 0.06 mm.
2. Threefold anneal at 710°C. Cooling at a rate of 40°C
per hour. Grain size 0.07 mm.
3. Quenching from 550°C in water. Grain size 0.06 mm.
4. Quenching from 900°C in water. Grain size 0.06 mm.
5. Quenching from 900°C in water, tempering at 500°C.
Grain size 0.06 mm.
6. Heating to 1180°C, soaking for 3 hours, slow cooling
(40°C/hour). Grain size 0.40 mm. Flat specimens (4 x 6 mm),
treated as above, were trimmed, polished and pulled in a
Gagarin machine. The elongation curves obtained (in Fig 1
each curve refers to the appropriate treatment variable)
were studied together with micro-structures obtained by
an electron microscope at a magnification of $\times 9000-10\,000$
(see Table, p.261). The Table shows the contradictions
of the tertiary cementite hypothesis. At certain
treatments there is a direct relationship between the

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A Contribution to the Problem Regarding the Nature of the Yield Plateau

magnitude of the yield plateau and the quantity of cementite, which can be assumed to be present from a consideration of the Fe-C equilibrium at all between these cases there is no relationship at all between these factors. The majority of ferrite grains are surrounded by a boundary visible at a magnification of $\times 1000$, which etches in one case as a double white streak, in the other case as a darker, continuous strip. Fig 1 is a diagram, showing elongation after different heat treatments. The number of each curve corresponds to the treatment number. In Fig 2 the microstructure of Armco iron is shown: a - after usual etching (by 4% HNO_3 sol.), b - after etching with sodium picrate. Fig 3 shows the microstructure of Armco iron after a threefold anneal at $710^\circ C$. Fig 4 shows the same iron as in Fig 3 after quenching in water from $900^\circ C$. Fig 5 shows a segregation of cementite in the iron, which was quenched in water from $550^\circ C$. Fig 6 shows the grain boundaries of iron quenched in water from $900^\circ C$. Fig 7 shows the segregation of cementite separated out during tempering of the

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A Contribution to the Problem Regarding the Nature of the Yield Plateau

quenched Armco iron. As a result of the above experiments, the authors have arrived at the following conclusions:-

1. No film of tertiary cementite has been observed in the intergranular transition layer of technically pure iron around the grains. The whole of the cementite is situated essentially along the grain boundaries, but in the form of separate massive segregations of fine disconnected precipitates. In this connection the presence of cementite cannot be responsible for the appearance of the yield plateau.
2. The electron microscopic picture of the structure of the grain boundaries of iron agrees well with the idea of a transition layer as a zone with a displaced position of atoms, with a large number of vacancies and with an increased number of atoms of dissolved substances.
3. The magnitude of the yield plateau is not related by the same sign with the width of the intergranular transition layer.
4. The yield plateau appears as a rule in iron which had been given a softening treatment (annealing, multiple

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A Contribution to the Problem Regarding the Nature of the Yield Plateau

annealing, tempering). However, on quenching the yield plateau is abruptly shortened or disappears entirely.

5. In coarse-grained iron the intergranular transition layer does not differ from the transition layer of fine-grained iron, including also the absence of a cementite film around the grains. No yield plateau is observed at any cooling rate.

There are 6 figures, 1 table and 6 references, 5 of which are Soviet, 1 German.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut zhelezodorozhного transporta (All-Union Scientific Research Institute of the Railway Transport)

SUBMITTED: April 11, 1957

Card 5/5

AUTHOR: Rauzin, Ya.R.

SOV/126-8-2-11/26

TITLE: Some Peculiarities of the Initial Stage of Plastic Deformation. II. The Appearance and Distribution of the First Slip Planes

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 2,
pp 225 - 234 (USSR)

ABSTRACT: Plastic deformation is normally expected to take place on the planes where slip can most easily occur. It is shown, however, that in samples of varying grain size, slip occurs first of all on the coarser grains independent of their orientation (Figure 1 for iron). Figure 2 shows the deformation necessary for slip lines to appear in samples of different grain sizes (Curve 1 for aluminium and Curve 2 for iron). Thus the coincidence of the planes of easiest slip with the tangential component of the applied force is not a sufficient condition for the development of initial slip in the grains. Slip lines are also not always at 45° to the direction of the stress as is demonstrated in Figures 3 and 4. In Figures 6-9 the dotted curves show the distribution of the direction of the initial

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SOV/126-8-2-11/26

Some Peculiarities of the Initial Stage of Plastic Deformation.
II. The Appearance and Distribution of the First Slip Planes

slip lines. The continuous curves show the distribution of slip planes where slip begins. The x-axis gives the angle made with the axis of the sample and the y-axis the relative quantity of planes or lines in the given direction (in percentage). Thus, in armco iron after carefully forging and heating to 900°C (with a mean grain size 0.07 - 0.08 mm), slip lines are present in all directions except at very small angles to the axis. The largest quantity are at 45° and 135° to the axis (Figure 6). For armco iron after forging and heating to 1180°C (mean grain size 0.6 - 1.0 mm), the number of slip lines at 45° and 135° to the axis is increased to 72% (Figure 7). For aluminium, after deformation and heating to 280°C, there is again a large percentage of slip lines at 45° to the axis (Figure 8). For fine-grained iron after hot rolling there are preferential directions of 40° and 60-65°.

Figure 10 shows X-ray photographs of armco iron after hot

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Some Peculiarities of the Initial Stage of Plastic Deformation.
II. The Appearance and Distribution of the First Slip Planes

rolling (a) and after forging (b). These show the preferential orientation of the crystallites in the former case. Metallographic observation together with the method of analysing the directions of the slip lines make it possible also to determine the character of the texture after rolling. Thus, for iron in the above example with preferred directions at $60 - 65^\circ$, the direction of rolling must be (112). This is confirmed from X-ray observations.

There are 10 figures and 7 references, of which 5 are Soviet, 1 English and 1 German.

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SOV/126-8-2-11/26

Some Peculiarities of the Initial Stage of Plastic Deformation.
II. The Appearance and Distribution of the First Slip Planes

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut
zheleznodorozhного transporta (All-Union Scientific
Research Institute of Railroad Transportation)

SUBMITTED: March 12, 1958

Card 4/4

SOV/180-59-3-26/43

AUTHORS: Rauzin, Ya.R. and Simonova, Ye.Ya. (Moscow)

TITLE: The Change in Electrical Conductivity of Metals in the Zone of the Critical Degree of Deformation

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 3, pp 136-139(USSR)

ABSTRACT: Experiments were first carried out on iron containing 0.06 C, 0.16 Si, 0.17 Mn, 0.015 P, 0.042 S. Samples were subjected to various degrees of deformation. By using different tempering temperatures, samples of different grain sizes were obtained. Fig 1 is a curve of the specific resistance against the degree of deformation. With small degrees of deformation there is a minimum in specific resistance. The decrease in specific resistance is less for coarse than for fine grained materials (Fig 2). The decrease may be explained by shrinkage in the metal. It is possible that "densification" occurs in the region where large amounts of vacancies, dislocations and other lattice defects occur, which causes an increase in electrical conductivity. The position of the minimum almost coincides with the critical degree of deformation. It

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SOV/180-59-3-26/43

The Change in Electrical Conductivity of Metals in the Zone of
the Critical Degree of Deformation

is proposed that the critical degree of deformation is caused by the same reasons as the minimum in the electrical resistance curve. The decrease in electrical resistance confirms that slip lines exist at small degrees of deformation, although they cannot be seen under the optical microscope. Similar curves of electrical resistance against degree of deformation are produced by aluminium (Fig 4) and the steel EI-69 containing 0.46 C, 13.9 Cr, 14.3 Ni, 2.3 W (Fig 5). There are 5 figures and 12 references, 9 of which are Soviet and 3 German.

SUBMITTED: September 18, 1958

Card 2/2

AUTHOR : Rauzin, Ya.R.

SOV/126-8-4-20/22

TITLE: On the Mechanism of the Initial Deformation Stage in
Polycrystalline Metals

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 4,
pp 631-635 (USSR)

ABSTRACT: In this article the author defends his views, expressed in papers Refs 2 and 3, against attacks by Sidorov (Ref 1). The main points are these: 1) the author had observed that a greater degree of total deformation was required to bring about slip in polycrystalline metal than in single crystals. He assumes that this is due to a different type of deformation, preceding slip, in which localised slip planes are formed. Sidorov disputes the correctness of this interpretation. 2) In his turn the author disputes Sidorov's assumption that slip lines become "thinner" as the grain size decreases. 3) Sidorov accepts the possibility of relative displacement of grains due to grain boundary flow. However, he doubts the author's statement that this flow can, up to a certain stage of deformation, occur in preference to processes within the grains. ✓

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SOV/126-8-4-20/22

On the Mechanism of the Initial Deformation Stage in
Polycrystalline Metals

The author proves his point by indirect evidence.
4) The author answers Sidorov's question as to why no
yield plateau is exhibited by metals in which
intergranular displacement occurs.
There are 2 figures and 28 references, of which 17 are
Soviet, 6 English, 3 German and 2 French.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut
zheleznodorozhnogo transporta
Card 2/2 (All-Union Scientific Research Institute of
Railway Transport)

SUBMITTED: September 25, 1958

AUZIN, Ya, R. Dr. Tech Sci — (giss) "Microscopic Investigation of the Initial Stage of Deformation and Subsequent Recrystallization of Polycrystals," Moscow, 1960, 30 pp, 150 copies (Moscow Institute of Steel im I. V. Stalin) (KL, 47/60, 101)

PHASE I BOOK EXPLOITATION

SC7/2511

Kievchastateltekhnicheskoye otdeleniye nauchno-tekhnicheskoy pressyshchennosti.
Kiyevskoye oblastnoye pravleniye.

Rezul'taty i tret'icheskaya koristivka fizicheskoy, metallovedicheskoy i heat
treatment of metals) Report. Kievchastatel, 1951. 35 p. Errata slip
inserced. 5,000 copies printed.

Sponsoring Agency: Gosudarstvennyy nauchno-tekhnicheskiy komitet
Soveta Ministriv SSSR. Machine-tekhnicheskaya oblastnoye
nauchno-tekhnicheskoy pravleniye. Kiyevskoye oblastnoye
pravleniye.

Editorial Board: N. P. Braun, Doctor of Technical Sciences, I. Ya.
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of Technical Sciences, and A. V. Chernovol, Candidate of Technical
Sciences, Ed.; M. S. Sovetskij Tech. Ed.; I. M. S.
Gomelskij, Sovetskij Tech. Ed.; V. K.
Sredyuk, Engineer, Chief Ed., MashEZ (Southern Dept.); V. K.

Card 1/20

PURPOSE: This collection of articles is intended for scientific
workers and technical personnel of research institutes, plants,
and schools of higher technical education.

SCOPE: The collection contains papers presented at a convention
held in Kiev on problems of physical metallurgy and methods of
heat treatment of steel applied in the machine industry.
Phase transformations in metal and alloys are discussed, and
results of investigations conducted to ascertain the effect of
heat treatment on the quality of metal are analyzed. The possi-
bility of obtaining steels with given mechanical properties
is discussed, as are problems of steel brittleness. The collec-
tion includes papers dealing with kinetics of transformation,
heat treatment, and properties of cast iron. No personalities
are mentioned. Articles are accompanied by references, mostly
Soviet.

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SOV/5511

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Physical Metallurgy (Cont.)

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Circ 6/0

S/137/62/000/004/110/201
A052/A101

1P. 8200

AUTHORS: Rauzin, Ya. R., Akimova, O. F., Tarasov, V. R.

TITLE: On the effect of macrostructure on the strength of bearing cups

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 48-49, abstract
41289 ("Tr. Vses. n.-i. in-ta zh.-d. transp.", no. 221, 1961, 72-84)

TEXT: Bearing steels of $\text{III} \times 15$ (ShKh15) and $\text{III} \times 15\Gamma$ (ShKh15SG) grades were investigated. The increase of density, obtained by the pressure work with a high degree of reduction in area raises σ_w and contact endurance of a hardened bearing steel. An increase of service life of axle bearing elements can be secured by a combination of a high metallurgical quality of the initial ingot with a pressure work (flattening) with a high degree of reduction in area. By passing over from a mixed fiber pattern, produced with the use of standard technology of forging cups on forging machines, to a longitudinal one the average service life of bearings can be increased by a factor of ~ 1.4 . VB

T. Rumyantseva

[Abstracter's note: Complete translation]

Card 1/1

BAUZIN, Ya. R., doktor tekhn. nauk; Prinimal uchastiye SPEKTOR, A.G.,
kand. tekhn.nauk; SHEYN, A.S., kand. tekhn.nauk, retsenzent;
KUNIN, P.A., inzh., red.; MODEL', B.I., tekhn. red.

[Heat treatment of chromium steel; for bearings and tools]
Termicheskaja obrabotka khromistoi stali; dlja podshipnikov
i instrumentov. Izd.2., perer. i dop. Moskva, Mashgiz, 1963.
383 p. (MIRA 16:8)

(Chromium steel--Heat treatment)

RAUZIN, Ya.R.

Review of S.L. Rustem's book "Equipment and the design of heat-treatment plants." Metalloved. i term. obr. met. no.10:60-61
O '63. (MIRA 16:10)

PARYSHEV, Yu.M., aspirant; RAUZIN, Ya.R., doktor tekhn. nauk

Characteristics of rails hardened by various methods. Vest.
TSNAT MPS 23 no.5:31-33 '64. (MIRA 17:11)

L 32051-65 ENT(m)/EXP(w)/EVA(a)/EPR/r/EMP(t)/EMP(b) Ps-4 JE/GS/WH

ACCESSION NR: AT4049790 S/0000/64/000/000/0101/0106

30
25
B+1

AUTHOR: Rauzin, Ya. R.

TITLE: Effect of metal macrostructure on contact endurance and durability of roller and ball bearings

SOURCE: AN SSSR. Institut mashinovedeniya. Kontaktnaya prochnost' mashino-stroitel'-nykh materialov (Contact strength of materials for machinery manufacture). Moscow, Izd-vo Nauka, 1964, 101-106

TOPIC TAGS: metal structure, steel structure, steel macrostructure, steel durability, ball bearing, roller bearing, bearing durability, contact endurance

ABSTRACT: The effect of macrostructure on contact endurance has not been studied in detail. It may be assumed that the importance of the macrostructure of steel in the basic metal and in manufactured bearings has been underestimated and has not been included in the GOST and TU regulations. Two factors of the macrostructure must be considered: steel density and the presence of pores, as well as the direction of metal fibers as indicated by the direction of heterogeneous crystallites and inclusions under thermal deformation. The present paper considers the effect of these factors on the contact endurance of steel in ball and roller bearings. Two sets of samples of different density were tested for contact endurance

L 32051-65

5

ACCESSION NR: AT4049790

using the S.V. Pinegin machine. Hollow samples were tested. A pressure of 450 kg/mm² and a speed of 14,000 rpm or 28,000 cycles per minute were used during the tests. Three directions of fibers were considered. The test results indicated that the macroscopic structure is of tremendous significance for the strength of bearing steel. Increasing the density under thermal pressure with high compression increases the fatigue limit and the contact endurance of hardened steel for bearings. The maximum increase in durability is attained when a high quality of the initial ingot is combined with thermal pressure and high degree of compression. Durability drops sharply when the fibers are located at an angle to the contact area. When the angle between the fiber and contact area is 40-45 degrees the bearings have the lowest strength, as this direction of the fiber coincides with the direction of maximum tangential stress. Fibers encircling the race, as well as longitudinal fibers, are found in bearings with the highest durability, as in both of these cases the direction of the fiber coincides with the plane of the contact area. "Part of the test were performed together with Engineers E.M. Turovskiy, Z.G. Komarovskiy and R.L. Kaminarskiy of the IGPZ." Orig.art. has: 2 figures and 4 tables.

ASSOCIATION: None

SUBMITTED: 03Mar64

ENCL: 00

SUB CODE: MM

NO REF SOV: 0Q3

OTHER: 000

Card 2/2

L 32972-65 EWT(m)/EWP(w)/EPF(c)/EWA(d)/T/EWP(t)/EWP(b) Pr-4 MJW/JD/DJ

ACCESSION NR: AP5000560

S/0133/64/000/012/1120/1122

AUTHOR: Rauzin, Ya. R. (Doctor of technical sciences)

TITLE: The effect of the electroslag remelting of electric steel used for bearings
on its mechanical properties and performance

SOURCE: Stal', no. 12, 1964, 1120-1122

TOPIC TAGS: remelting, electroslag melting, mechanical property, roller bearing

ABSTRACT: A comparative study of standard electric ShKh15SG steel used for bearings and other control specimens having a similar composition was carried out with a view to assessing the effect of remelting on the performance of large railroad bearings. The composition was: 0.005 to 0.007% S; 0.012 to 0.020% P; 0.09 to 0.20 Ni, 0.09 to 0.10% Cu; 1.05 to 1.07% C; 0.69 to 1.70% Mn; 1.44 to 1.80% Cr; 0.27 to 0.52% Si. Metallographic examination showed the remelted steel to possess a much higher density than regular steel and the amount of non-

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ACCESSION NR: AP5000560

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metallic inclusion to be reduced by half. An increase in the Cr content, and a decrease in Mn somewhat improved properties but did not secure a substantial increase in the service life. The contact strength rose by 78% and the fatigue limit by 37% after the remelting of ShKh15SG steel. The performance of the specimens under service conditions was checked by observing specially prepared spherical roller bearings. The mean increase in the life span was 2.1 to 2.6 times that of non-remelted steel, and the deterioration due to fatigue decreased by 7 to 10 times. "The contribution of I. M. Semenov, Candidate of Technical Sciences, is acknowledged." Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NO REF Sov: 003

OTHER: 000

Card 2/2

L 00025-66 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) JD
ACCESSION NR: AP5022576 UR/0129/65/000/009/0021/0025
669.14.018:621.785.545.616
36
93
B

AUTHOR: Shur, Ye. A.; Rausin, Ya. R.

TITLE: Effect of single and double heat treatment on the properties of medium-carbon low-alloy steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 9, 1965, 21-25, and insert facing p. 24

TOPIC TAGS: metal heat treatment, carbon steel, low alloy steel, fatigue strength, hardness, impact strength, tensile strength, plastic strength

ABSTRACT: The structure and properties of medium-carbon low-alloy steel subjected to double heat treatment (martempering) were compared with the structure and properties of the same steel when subjected to single heat treatment (direct formation of ferrite-carbide mixture from austenite). The microstructure of martempered specimens was sorbitic, while that of specimens subjected to single heat treatment was chiefly bainitic. Tensile, fatigue, notch, and wear-resistance tests of specimens with the same hardness (HRC 38-50) showed that the yield point

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I.00025-66

ACCESSION NR: AP5022576

of the martempered specimens is 15-20 kg/mm² higher than that of specimens subjected to single heat treatment. Relative elongation and reduction of area in martempered specimens, on the other hand, were lower than in specimens subjected to single heat treatment, which indicates a high plasticity margin following single heat treatment. Tensile strength and fatigue limit are more or less the same whatever the regime of heat treatment, which indicates that the static and cyclic strength of the steel with sorbitic structure is affected not by the fine structure of ferrite but by the dispersity of carbides. The other properties (plasticity, ratio of yield point to strength, wear resistance), which are more associated with the fine structure of the ferritic base of steel, at HRC 38-45 are higher following single heat treatment than following martempering. All this points to certain advantages of the single heat treatment of medium-carbon low-alloy steel with Rockwell hardness of 38-50. At lower hardness, martempering causes higher impact strength, which should be taken into account for products performing under conditions of dynamic loading. Orig. art. has: 6 figures.

ASSOCIATION: Tsentral'nyy institut shchel'snodorozhnogo transporta (Central Institute of Railroad Transport)

Cord 2/3

L 00025-66
ACCESSION NR: AP5022576

SUBMITTED: 00 ENCL: 00 SUB CODE: MM, SS
NO REF SOV: 002 OTHER: 001

Card 3/3

L 00026-66 EWT(m)/EWF(w)/EVA(d)/T/EWP(t)/EWP(z)/EWP(b) IJP(c) JD
ACCESSION NR: AP5022577 UR/0129/65/000/009/0025/0027
620.17:669.15-194 28
26
3

AUTHOR: Velikanov, A. V.; Rauzin, Ya. R.

TITLE: Effect of carbon content on the properties of high-carbon low-alloy steels

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 9, 1965, 25-27

TOPIC TAGS: carbon steel, low alloy steel, impact strength, hardness, fatigue strength, cyclic load

ABSTRACT: The authors present the results of an investigation of the properties of low-alloy chrome-vanadium and manganese steels as a function of their C content (0.38 to 0.70%). Specimens with fixed hardness (H_B 350 and 450) were obtained by varying the tempering temperature. In the presence of identical hardness, strength also proved to be identical whatever the C content within the range investigated, but the yield point differed. As the C content increases in specimens of low-alloy steels endowed with Brinell hardness of 450 the ratio of yield point to strength increases, whereas in specimens with $H_B = 350$ this ratio

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L 00026-66

ACCESSION NR: AP5022577

decreases. The plasticity and impact strength of steels with $H_b = 350$ and 450 decrease with increasing C content. On the other hand, increasing the C content of these steels (to 0.60-0.65%) favorably affects the increase in fatigue limit. The optimal C content of machine steels depends on the character of loading. If the loading is cyclic, C content should be increased to 0.60-0.65%. In products performing under impact, on the other hand, the C content should be lower (optimally 0.6% C). Orig. art. has: 5 figures, 1 table.

ASSOCIATION: Tsentral'nyy institut zhelezodorozhnoho transporta (Central Institute of Railroad Transport)

SUMMITTED: 00

ENCL: 00

SUB CODE: MM, MT

NO REF SOV: 005

OTHER: 000

Chrom-vanadium Steel

Card

dry
2/2

L 56072-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c) IJP(o) pr-4
JD/HW/JG

UR/0126/65/019/005/0762/0768 31
539.4.015.1 34

ACCESSION NR: AP5013814

AUTHOR: Velikanov, A. V.; Rauzin, Ya. R.

TITLE: Microscopic examination of the plastic deformation of alloyed iron and steel

SOURCE: Fizika metallov i metallovedeniya, v. 19, no. 5, 1965, 762-768

TOPIC TAGS: microscopic examination, alloyed iron, ferrosilicon, ferro-chromium, twinning deformation, localized shear, plastic deformation, static tensile test, dynamic tensile test, electron microscope, optical microscope, interference microscope

ABSTRACT: The plastic deformation that occurs in the microvolumes of a metal is the most important link in the general chain of plastic deformation preceding the fracture of the material. The mechanism of the fracture cannot be properly understood unless the build-up of plastic deformation in the microvolumes is investigated beginning with the smallest stages. Electron and interference microscopy revealed that plastic deformation in the micro-

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L 56072-65

ACCESSION NR: AP5013814

volumes of iron and of other metals as well, consists in the formation of slip bunchings in grains, inter-grain dislocations, and deformation not detectable by an optical microscope. In isolated cases deformation occurs through twinning, formation of flexure bands, etc. In this connection, the authors investigated the special features of the deformation of microvolumes in the case of alloyed iron with the object of determining the predominant types of grain deformation in this iron as well as the types of deformation most responsible for the commencement of fracture. Iron alloyed with 2.5-3% chromium, manganese, nickel, and silicon was subjected to static and dynamic tensile tests. Iron without these alloys was subjected to the same tests for purposes of comparison. The resulting deformation was examined with the aid of electron, interference, and optical microscopes. It was established that plastic deformation in the microvolumes of the alloyed iron is extremely nonuniform, both between the grains and within the confines of individual grains. No qualitative difference between the types of deformation of individual grains of iron alloyed with Cr, Mn, Ni, Si and those of unalloyed iron was observed. On the other hand, differences have been observed in the number of grains subject to a given type of deformation (localized shear, elastic flexure, edge bending of part of grains, displacement of grains along boundaries), and in the rate of occurrence of localized shear, depending on the nature of the alloy element present in the iron. In particular, the

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number of grains with localized shear increases more rapidly in chrome
ferrite. Low dynamic deformations result in the same types of grain
deformation as static tensile tests, whereas in the case of high dynamic
deformations the number of grains subject to a given type of deformation
differs greatly. Orig. art. has: 8 photographs,
1 table.

ASSOCIATION: VNII zheleznodorozhnogo transporta (VNII of Railroad Transport)

SUMMITTED: 08Apr64

ENCL: 00

SUB CODE: MM, AS

NO REF Sov: 010

OTHER: 001

bob
Card 3/3

SIVK, Ya.A., Inzh.; RAUZIN, Ya.R., doktor tekhn. nauk

Nonuniformity of the structure of hardened rails. Vest. TSMJII
MPS 24 no.1:37-41 '65. (MIRA 18:6)

RAVIN, Ya.S., VELIKANOV, A.V.; GORDYUK, Yu.V.; SHCH, Ye.A.

Investigating the structure and properties of rails hardened
along their entire length by induction heating. Stal' 25
no.12:1122-1126 D '65. (MIRA 18:12)

RAVANY, M.; PINEL, M.; ABRAHAM, E.

Studies on the occurrence of poliomyelitis virus in Hungary. In English.
p. 399. Vol. 3, No. 4 1956. ACTA MICROBICA. Budapest, Hungary.

SOURCE: East European Accessions List, (EEAL) Library of Congress Vol. 6
No. 1 January 1956

RAVAR, Ion

Proportionality in the development of Departments I and II
of the social production. Probleme econ 17 no.8:117-128 Ag '64.

1. Deputy Director General, Central Statistical Directorate.

RAVAN, I., candidat in stiinte economice; HLEVCA, M.

Problems of the balance of branch relations. Problems
econ 15 no.7:17-30 J1 '62.

RAVAR, I., kandidat na ikonomicheskite nauki

Big upsurge of industries in Rumania. Khim i industriia 36 no.7:
267-269 '64.

1. Assistant Chief Director, Central Statistical Administration.

Răverut, M.; Mititelu, D.

Additions to the study of natural prairies in the basin of the Putna and
Susica rivers, region Galati. p. 63.

LUCRARI STIINȚIFICE. (Institutul Agronomic "Profesor Ion Ionescu de la Brad,"
Iasi) Bucuresti, Romania.

Monthly list of East European Acquisitions (SEAI) LC, Vol. 8, no. 8, Aug. 1959

Uncl.

RIVAC, G.

Din istoria petrolului romnesc (From the History of Romanian Petroleum);
a book review. p. 47. PETROL SI GAZE. (Asociatia Stiintifica a Inginerilor
si Tehnicienilor din Romania si Ministerul Industriei Petrolului) Bucuresti.
Vol. 6 (i. e. 7) no. 1, Jan. 1956

So. East European Accessions List Vol. 5, No. 9 September, 1956

RAVAS, G.

3282. HISTORY OF ROUMANIAN PETROLEUM. (DIN ISTORIA PETROLULUI
ROMINESC). Rivas, G. (Bucuresti: E.S.P.L.P., 1955, 344pp.; rev. in Neft,
Khoz. (Oil Ind., Moscow), Nov. 1956, 68, 69). The book deals largely with
past exploitation, but some information is given on the present situation. *Fast*

Crude production in 1955 was 10.6 million tons against the prewar maximum of
8.6 million in 1936. *QMB* *m*

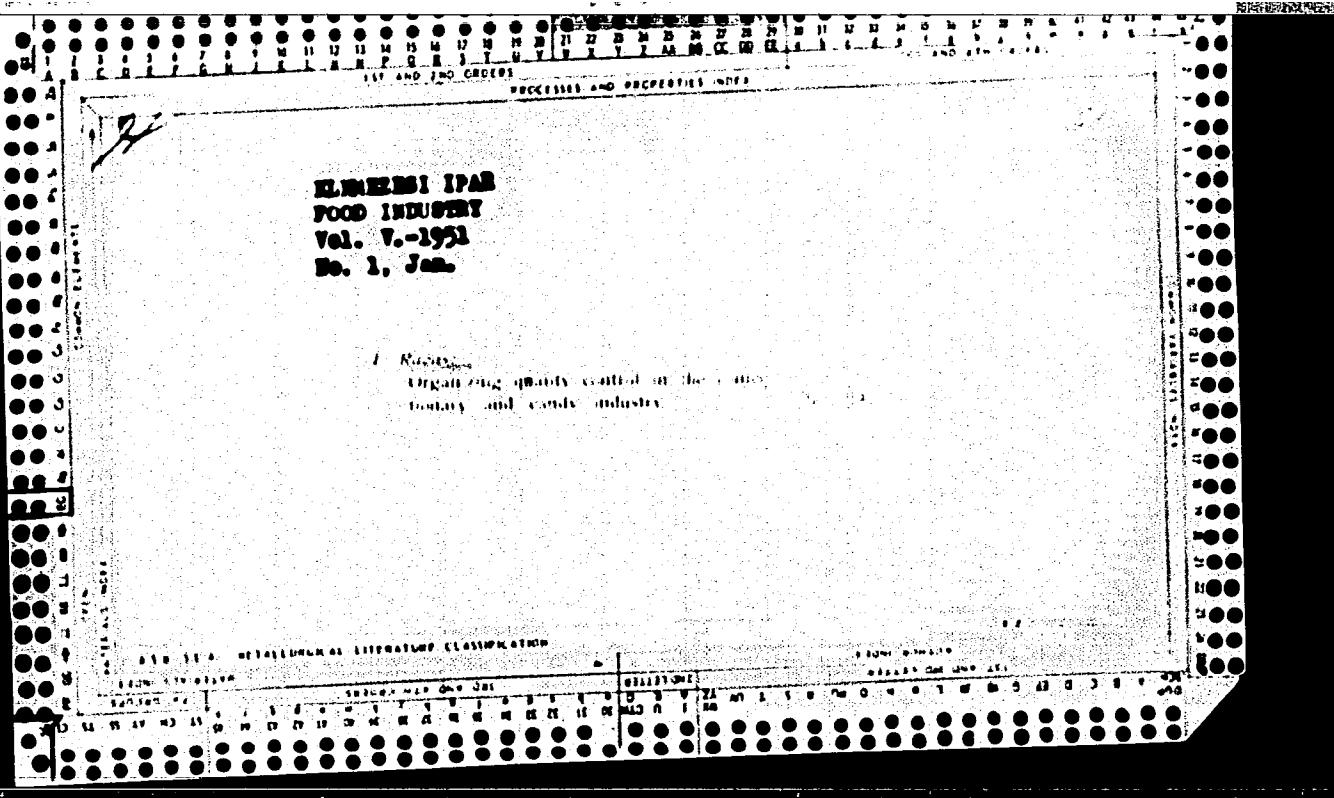
GUSPAN, Jan, inz.; RAVAS, Jan

Result of the research on sowing some main crops on fields
used for forage plant cultivation for several years. Rost
vyroba 9 no.3/4:391-398 Mr-Ap '63.

1. Vyzkumny ustav rastlinnej výroby, Piešťany.

RAVASH, G.[RAVAS, GH.],; LERKDEV, M.Ya., KARYAGIN, I.D., kand.
ekon. nauk, red.; PETROVA, Ye.A., ved. red.; POLOSINA, A.S., tekhn. red.

[History of the Rumanian petroleum industry] Iz istorii rumyanskoi
nefti. Pod red. I.D.Kariagina. Moskva, Gos. nauchno-tekhn. izd-vo
neft. i gorno-toplivnoi lit-ry, 1958. 240 p. (MIRA 11:10)
(Rumania--Petroleum industry)



FOGEL', Mariya [Fogel, Marial], dots.; NAD', Zoltan [Nagy, Zoltan],
SIZA, Mario [Sziza, Mario], dokter [translator]; .;
RAVAS, Yanosh [Ravasz, János], dots., nauchn. red.;
ERDEI, Mikhay [Erdei, Mihály], dots., nauchn. red.;
BERNAT, D'yerd' [Bernát, György], otv. izdatel'; ALEKSA, M.
[Aleksza, M], red.; CHERGE, I.[Csörgő, I.], tekhn. red.
[X-ray atlas of traumatology] Rentgenovskii atlas po trav-
matologii. Budapest, 1964. 439 p. Translated from the Hungarian.
(MIRA 17:3)

1. Zaveduyushchaya otdelom rentgenologii III terapevti-
cheskoy kliniki Budapeshtskogo meditsinskogo universiteta
i Gosudarstvennogo Instituta Travmatologii (for Fogel').
2. Glavnyy rentgenolog Budapeshtskoy TSentral'noy Trav-
matologicheskoy Ambulatorii (for Nad').



HUNGARY / Laboratory Equipment. Instrumentation. F

Abs Jour: Ref Zhur-Khimiya, No 1, 1959, 1062.

Author : Csordas, L., Ravasz, E., Zsoldos, L.

Inst : Not given.

Title : A Two-Beam Roentgen Monochromator.

Orig Pub: Magyar fiz. folyoirat, 1958, 6, No 1, 47-50.

Abstract: A crystalline monochromator is described having two crystals (NaCl and HBr, 8 x 8 x 2 millimeters) in free orientation, dividing the exit beam from the Roentgen tube into two individual monochromatic beams. Plans for the basic design and photographic pictures of the instrument are given. -- S. Rosenfel'd.

Card 1/1

33

OBAL, F.; MOZES, M.; ERDEI, P.; Technischer Mitarbeiter: J. Ravasz.

Role of the nervous system in the effect of drugs of various actions producing increased metabolic rate. Acta physiol. hung. 7 no.3:245-249 1955.

1. Physiologisches institut und pathophysiologisches institut der Medizinischen Universitat, Targu Mures, Rumanien.

(AMPHETAMINE, effect,
on metab. rate, role of nervous system)

(NITROPHENOLS, effects,
dinitrophenol, on metab. rate, role of nervous system)

(NERVOUS SYSTEM, physiology,
in metab. response to amphetamine & dinitrophenol)

(METABOLISM, TISSUE, effect of drugs on,
amphetamine & dinitrophenol, role of nervous system)

OBAL, F.; MOZES, M.; KLEMEN, A.; FALL, S.; Technische Assistenz:
J. Ravasz.

Role of the nervous system in hypothermic action of pentamethylene-tetrazole. Acta physiol. hung. 7 no.3:211-221 1955.

1. Pathophysiologisches Institut und Pharmakologisches Institut der
Medizinischen Universität, Targu Mures, Rumanien.

(PENTYLENETETRAZOLE, effects,
hypothermic, role of nervous system)

(BODY TEMPERATURE, effect of drugs on,
pentylenetetrazole, role of nervous system in hypothermic
action.)

(NERVOUS SYSTEM, physiology,
in hypothermic action of pentylenetetrazole)

ORAL, F.; KELEMEN, L.; DOZSI, Z.; RAVASZ, J.

Cerebrospinal fluid in typhus. Acta med.hung. 7 no.1-2:135-145
1955.

1. Klinik fur Infektionskrankheiten und Pathophysiologisches
Institut der Medizinischen und Pharmaceutischen Hochschule,
Marosvasarhely (Targu-Mures) Rumanien.

(TYPHUS, cerebrospinal fluid in.)
(CEREBROSPINAL FLUID, in varicus diseases,
typhus)

RAVASZ, Janos, dr.

Treatment of supracondylar fractures of the humerus in children. Orv.
hetil. 102 no. 41:1940-1944 80 '61.

1. Orszagos Traumatologiai Inteset.

(HUMERUS fract & disloc)

HUNGARY / Chemical Technology. Chemical Products and Hi-28
Their Applications. Food Industry.

Abs Jour: Ref Zhur-khimiya, No 3, 1959, 9983.

Author : Ravasz, L.
Inst : Not given.
Title : Technology and Quality.

Orig Pub: Elelm. ipar, 1958, 12, No 3, 67-73.

Abstract: Instances of lowered food quality by Hungarian concerns are studied, caused by violating the technology of raw material storage and its processing. -- S. Rosenfeld.

Card 1/1

M.GYENGE, Anna; RAVASZ, Laszlo

The use of mathematical statistics for quality control in the
food industry. Elelm ipar 13 no.9:290-297 S '59.

1. Kereskedelmi Minsegellenorzo Intezet.

MORITZNE, GYENGE, Anna; RAVASZ, Laszlo

Further development of the quality control in the food industry
by means of mathematical statistics. Elelm ipar 17 no.6:177-
184 Je '63.

1. Kereskedelmi Minosegellenorzo Intezet.

HAVANÉ, László

Scientific data on ice cream. Elet tud 19 no.32:1506-1509
7 Aug '64.

1. Head, Food Industry Division, Commercial Quality Control
Institute, Budapest.

RAVASZ, Laszlo, dr.

On tumors of the maxilla. Magy. onkol. 7 no.1:40-47 Mr '63.

1. Fovarosi Uzsoki utcai Korhaz, Onkoradiologial Intezet es Onkologial
Gondozó Intezet.
(MAXILLARY NEOPLASMS) (ADENOCARCINOMA) (SARCOMA, OSTEOGENIC)
(CYLINDROMA) (SURGERY, OPERATIVE) (RADIOTHERAPY)
(PARANASAL SINUS NEOPLASMS)

RAVASZ, Laszlo, dr.

Mixed tumors of the mesopharynx. Fulorrgegegyogyaszat 9 no.1:14-19
Mr '63.

1. Fovarosi Uzsoki utcai korhaz (Budapest) Onkoradiologai Intézetnek
(Fovaros: Vando Ferenc dr.) kozleménye.
(RADIOTHERAPY) (PHARYNGEAL NEOPLASMS)
(MIXED SALIVARY GLAND TUMOR) (PALATAL NEOPLASM)

RAVASZ, Laszlo, dr.

Cobalt applicator. Orv. hetil. 105 no.14:645-646 5 Ap'64

1. Fovarosi Uzsoki utcai Korhaz, Onkoradiologai Intezet.

*

L 9020-66 EWT(m)

ACC NR: AP6001838

SOURCE CODE: HU/0021/65/000/001/0008/0012

AUTHOR: Vandor, Ferenc—Nandor, F. (Doctor); Ravasz, Laszlo—Ravas, Z. (Doctor) ²⁶ _B

ORG: Metropolitan Institute of Oncology, Uzsoki Street Hospital, Budapest (Fovarosi Onkoradiologial Intezet, Uzsoki utcai Korhaz)

TITLE: Problem of tumors arising following the radiation therapy of benign disorders ¹⁹

SOURCE: Magyar Radiologia, no. 1, 1965, 8-12

TOPIC TAGS: tumor, radiology, radiotherapy, radiation biologic effect, pathology

ABSTRACT: Nine cases of radiogenic tumors are described which developed following radiation treatment of benign disorders. Following irradiation with high doses, severe degenerative changes were present in every case. The tumors developed several decades after the radiotherapy. The probability of the development of radiogenic tumors is very slight when correct techniques are used. In spite of this, the indications of radiotherapy in cases of benign disorders should be limited in a realistic manner. Orig. art. has: 3 figures. [JPRS]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 003 / OTH REF: 011

jw

Card 1/1

RAVASZ, Laszlo, dr.

Recurrent basal cell carcinoma of the skin. Orv. hetil. 106
no.35:1640-1645 29 Ag '65.

1. Fovarosi Uzsoki Korhaz, Onkoradiologiai Intezet (osztaly-
vezeto soorvos: Vandor, Ferenc, dr.) es Kozponti Onkologiai
Gondozo (vezeto soorvos: Karpati Gyorgy dr.).

HUNGARY

NEMETH, Dr Gyorgy, and RAVASZ, Dr Laszlo; Budapest Institute of Oncoradiology
(Fovarosi Onkoradiologial Intezet), Uzsoki Street Hospital (Uzsoki utcai
Korhaz), Budapest.

"Results of the Treatment of Metastases to the Neck"

Budapest, Mazsar Onkologia, Vol 10, No 4, Dec 1966; p 203-204.

Abstract: A statistical survey of 237 patients with nasopharyngeal and oropharyngeal tumors and 586 patients with tumors of the oral cavity, treated at the Budapest Institute of Oncoradiology during 1949-1961 showed that about 29% of the patients belonging to the first group and 26% of those belonging to the second group were free of symptoms five years after the operation. The survival rate of patients in whom tumors originating in the oral cavity has led to metastases is very low. The results were better in the case of metastases of nasopharyngeal tumors, and very good in the case of tumors originating in the oropharynx. No references.

1/1

"Promise of the Bekescsaba Brick Factory to Encourage the Movement." p. 3
"Awards to the Best Innovation Commissioners in the Brick Industry." p. 3
"A Keen Man Should Head the Movement in the Kobanya Brick Factory." p. 9
"Innovators' Movement Neglected in the Pestmegye United Brickworks." p. 9
"Spreading the Kartavcev System of Brick Drying." p. 9
(Ujítok Lapja. Vol. 5, no. 5 Mar. 1953 Budapest.)

Vol. 3, no. 6

SC: Monthly List of ~~east European~~ Accessions, Library of Congress, June 1954, Uncl.

1. 4. 5. 6.

Investigation of water circulation in soil by sampling. p. 375. IEGJARAS.
(Meteorologial Intezet es Magyar Meteorologial Tarsasag) Budapest. Vol. 59, no. 6,
Nov./Dec. 1955.

SOURCE: East European Accessions List (EAL), Library of Congress
Vol. 5, no. 6, June 1956

RAVASZ, T.

RAVASZ, T. Remarks on the article "Large-scale Increase of Soil Capacity by Covered Stubble." P. 391.

Vol. 8, No. 9, Sept. 1956

AGRICULTURAL

AGRICULTURE

Budapest, Hungary

See: East European Accession, Vol. 6, No. 2, Feb. 1957

1957, 1. Some remarks about meteorologic problems and syncretists. p. 25.

Vol. 60, No. 4, July/Aug. 1956

1956/1957

33 Years

Budapest, Hungary

See: First European Association, Vol. 6, No. 2, Feb. 1957

GOLYSHEVA, M.G.; RAVAYEVA, M.Yu.

Determination of vitamin B₁₂ by the lamellar-diffusion method.
Trudy VNIVI 6:281-285 '59. (MIRA 13:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy vitaminnyy institut.
Mikrobiologicheskaya laboratoriya.
(CYANOCOBALAMINE)

GOLEYSHEVA, M.G.; RAVAYEVA, M.Yu.; LIBER, L.I.

Microbiological method for the determination of vitamin B₁₂ with
the aid of *Ochromonas malhamensis* culture. *Vop.med.khim.* 6 no.1:
100-104 Ja-F '60. (MIRA 13:5)

1. All-Union Research Institute of Vitamins, Moscow.
(VITAMIN B₁₂ chem.)
(PROTOZOA)

RAVBAR, Zlatan, inz.

New trends in the construction of automobile motors. Stroj vest 9-~~mo.4/5~~:
147-148 O '63.

1. Tovarna avtomobilov in motorjev, Maribor.

RAVCHENI, V. M.

"Effect of Lumbar Sympathectomy on Collateral Lymph Circulation."
Cand Med Sci, First Leningrad State Medical Inst, Leningrad, 1954.
(RZhBiol, No 6, Mar 55)

SO: Sum. No. 670, 29 Sep 55--Survey of Scientific and Technical
Dissertations Defended at USSR Higher Educational Institutions (15)

RAVCHEV, V., inzh.

New barrel lifter. Khol. tekhn. 35 no.1:62-64 Ja-F '58.

(MIRA 11:2)

(Loading and unloading) (Barrels)

MAMYKIN, P.S.; USKUMBAYEV, N.U.; RAVDANIS, B.I.; YAKUSHEV, Ye.A.; PSHENBAYEV, R.G.;
SIMKIN, E.A.

Testing high-alumina refractories. TSvet.met. 38 no.3:35-36 Mr 165.
(MIRA 18:6)

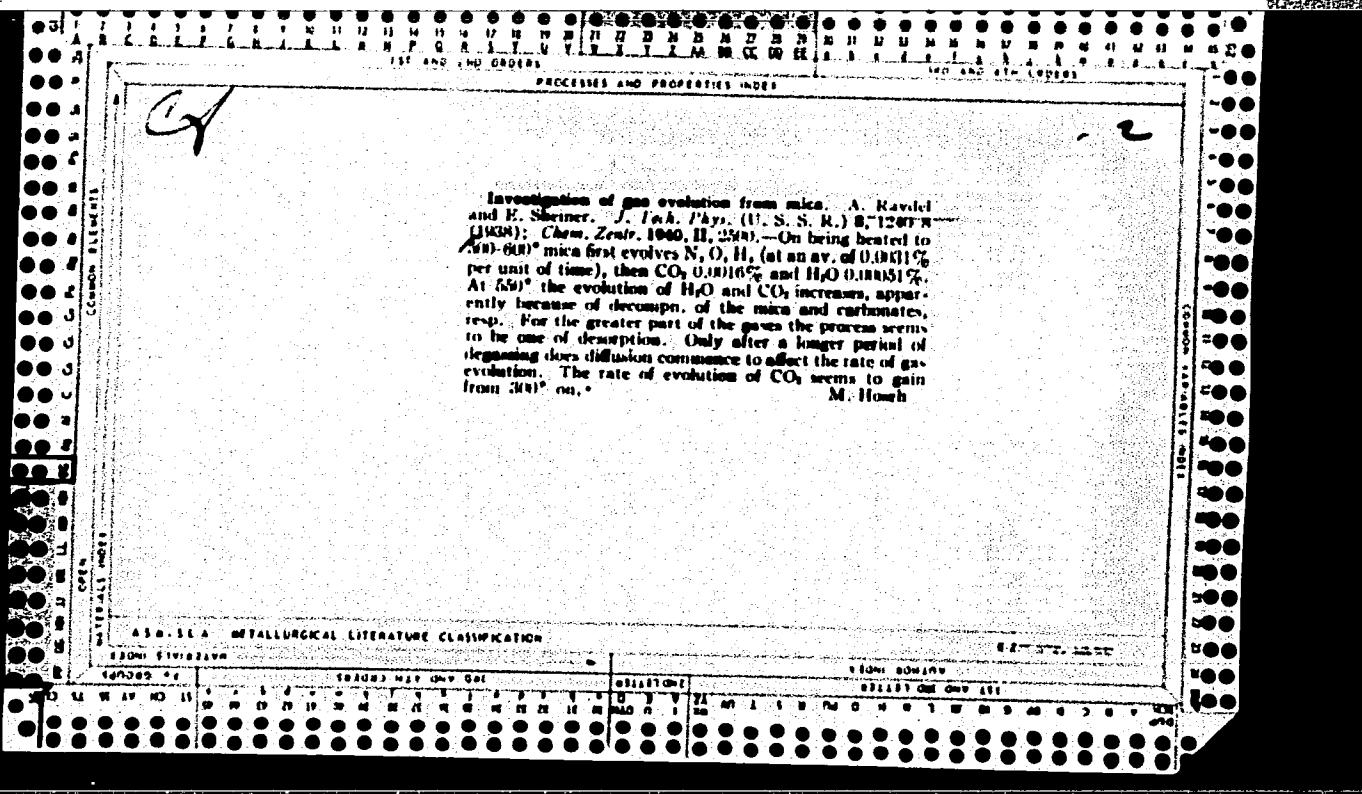
RAVEK, Miloslav, CHERNOVA, O.O., [translator].

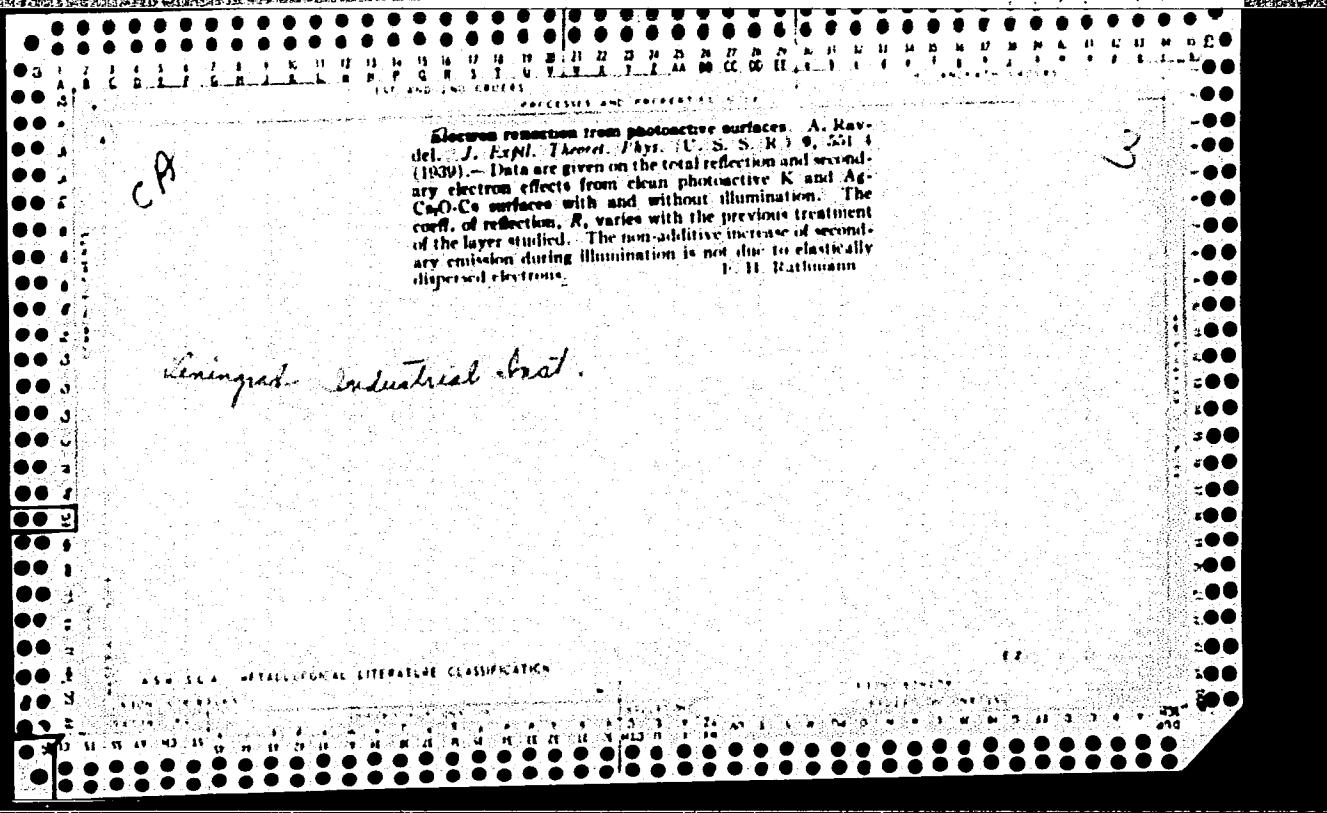
Is continuous yarn spinning feasible? Tekst. prom. 17 no.5:65-67
My '57. (MLRA 10:6)
(Czechoslovakia--Spinning)

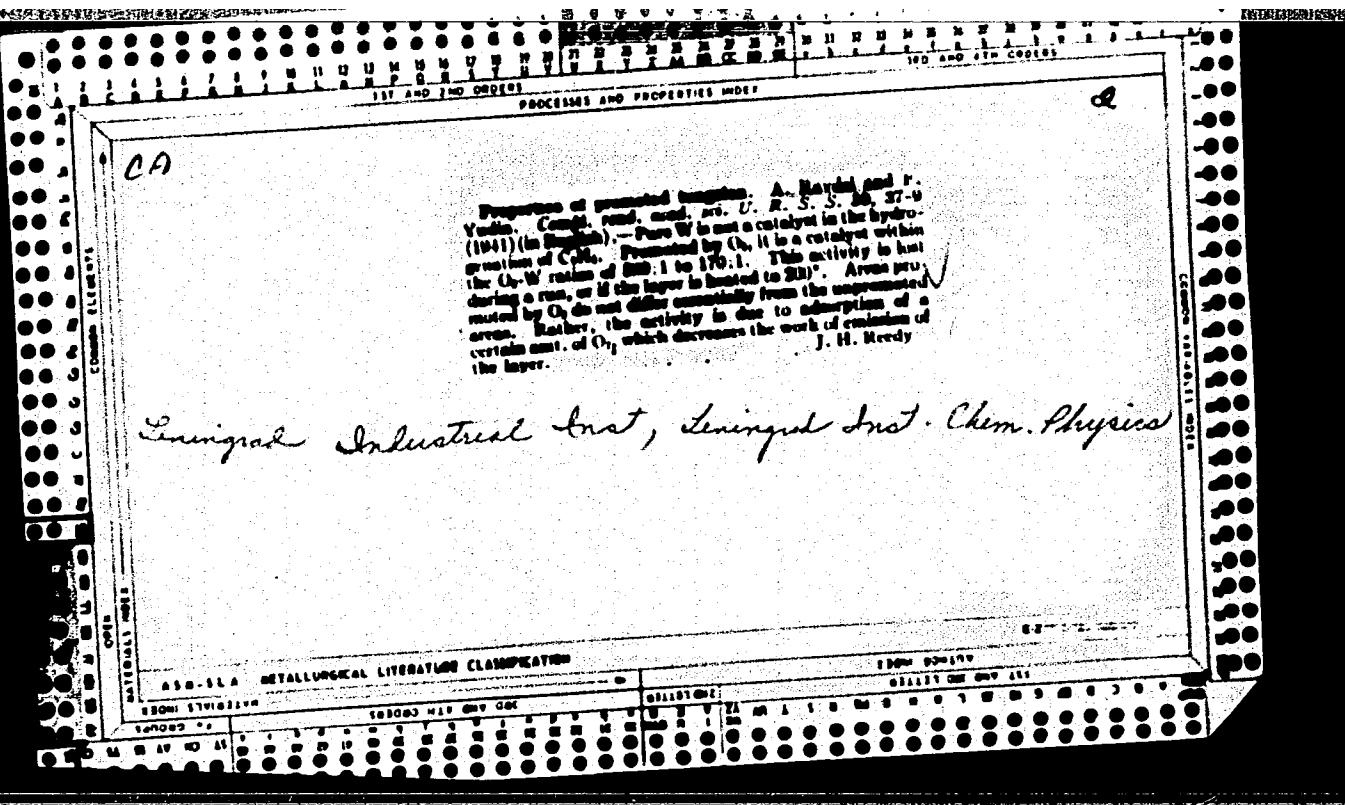
RAVER, Yu.A.

Mechanization of intrafactory transportation in new industrial
buildings. Tekst. prom. 17 no.7:55-56 J1 '57. (MIRA 10:9)

1. Glavnny mekhanik Cheboksarskogo kombinata.
(Conveying machinery) (Textile factories)







174 VdE / A.
USSR/ Physics - Vacuum techniques

FD-1035

Card 1/1 : Pub. 153 - 6/23

Authors : Lyubovskaya, E., and Ravdel', A.

Title : Investigation into the absorptive power of non-atomized gas-absorbers

Periodical : Zhur. tekhn. fiz., 24, 1392-1400, Aug 1954

Abstract : Study the absorptive power of zirconium and titanium, with admixture of thorium, in relation to hydrogen and oxygen in the range from room temperature to 700° C. Conclude that zirconium and titanium gas-absorbers very effectively absorb hydrogen and oxygen under definite temperature conditions, thus permitting their use in electron tubes as getters to improve or maintain the vacuum. Find the temperature dependence of the absorptive capacity. Thank Academician A. N. Terenin. Two references, both non-Russian.

Institution : - -

Submitted : 25 March 1954

PHASE I BOOK EXPLOITATION SOV/3557

Kratkii spravochnik fiziko-khimicheskikh velichin (Short Handbook of Physical and Chemical Values) 3rd ed., enl. Leningrad, Goskhimizdat, 1959. 122 p. 50,000 copies printed.

Compilers: N. M. Baron, E. I. Kvyat, Ye. A. Podgornaya, A. M. Ponomareva, A. A. Ruvdel'; and Z. N. Timofeyeva; Ed. (Title page): K. P. Mishchenko and A. A. Ruvdel'; Ed. (Inside book): N. K. Lobina; Tech. Eds.: S. S. Levin and T. A. Fomkina.

PURPOSE: This book is intended for students at schools of higher education and teknikums, aspirants, and teachers.

COVERAGE: This handbook contains tables on the most important physical and chemical values used in physical chemistry laboratory work and for various calculations in physics and chemistry. In this third edition of the handbook important changes have been included in the tables for radioactivity and nuclear reaction, thermodynamic values, empirical data and ratios for calculating thermodynamic values, and photochemical reactions. The remaining tables have been revised and slightly enlarged. The tables for radioactivity, nuclear

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Short Handbook of Physical (Cont.)

SOV/3557

reaction, and protection from radioactive radiation were revised and enlarged under the direction of I. A. Vasil'yev and the editorship of K. A. Petrzhalak. The handbook contains a four-place logarithm scale. There are 82 references: 51 Soviet, 28 English, 3 German.

TABLE OF CONTENTS:

Foreword to the Third Edition	3
D. I. Mendeleev's periodic table of chemical elements	4
1. Important constants	6
2. Relationship between different units of energy	7
3. Elementary particles	8
4. Radioactive series	10

Card 2/ 02

RAVDEL', A.A.; CORELIK, G.N.

Study of the kinetics of lead dissolution in nitric acid by
the rotating disk method. Zhur. prikl. khim. 37 no.2:275-
285 F '64. (MIRA 17:9)

1. Leningradskiy tekhnologicheskiy institut imeni Lensoveta i
Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut
mineral'nykh pigmentov.

KREMNEV, L.Ya.; NIKISHECHKINA, L.A.; RAVDEL', A.A.

Stability of emulsions. Dokl. AN SSSR 152 no.2:372-374 S '63.
(MIRA 16:11)

1. Leningradskiy tekhnologicheskiy institut im. Lensoveta.
Predstavлено Akademikom P.A. Rebinderom.

RAVDEL', A.A.; KREMNEV, L.Ya.; REBINDER, P.A., akademik.

Boundary dimensions of droplets in emulsions. Dokl. AN SSSR no.4:599-602
(MLR 6:5)
Je '53.

1. Akademiya, Nauk SSSR (for Rebinder). 2. Leningradskiy tekhnologicheskiy
institut im. Lensoveta (for Ravdel', Kremnev). (Drops) (Emulsions)

RAVDEL, A.A.

Thermodynamic characteristics of nitric acid. K. P.
Mishchenko and A. A. Ravdel. J. Appl. Chem. U.S.S.R.
26, 303-10 (1953) (Eng. translation). See C.A. 48, 6632c.
H. L. H.

RAVDEL, A. A.

Chemical Abstracts

May 25, 1954

General and Physical
Chemistry

Thermodynamic characteristics of nitric acid. K. P.
Mishchenko and A. A. Ravdel [Leninovet' Technol. Inst.,
Leningrad]. Zhur. fizich. khim. 26, 343-4 (1953).
Standard reference books (Russian) continue to publish
wrong data for HNO₃. Cor. values are compiled using all
of the data given by Vorsythe and Giauque (C.A. 36, 1233)
except those for the free energy of formation from the ele-
ments. The free-energy values cor. for "obvious errors"
yield the following values, in cal. per mole, at 298.10°K.
and 1 atm.: HNO₃ (l), $\Delta F^\circ = -19,032$; HNO₃ (g),
 $\Delta F^\circ = -17,550$.

MW

Ravdel, A. A.

The problem of solution of gas bubbles in liquid. A. A. Ravdel (Leningrad Technol. Inst., Leningrad). ZAMP. Trudy Khim. 26, 782-8 (1953).—Math. discussion of the detn. of the rate of soln. of gas bubbles in a liquid. The process of dissolving of the bubbles in water was considered for the following cases: (1) water that does not contain dissolved gases and (2) water that does contain dissolved gas e.g., O₂. Math. relations are introduced for the purpose of detg. the rate of soln. of floating bubbles of gas at different rates of bubble flow, and for calcg. the length of path passed over by the bubble until it is completely dissolved.

Gladys S. Macy ✓

RAVDEL, A. A.

4

USSR

541.18.05

3976. Conditions of the spontaneous disintegration of drops during emulsification. I. YA. KREINOV AND A. A. RAVDEL. Dokl. Akad. Nauk SSSR, 98, No. 3, 463-7 (1953) *In Russian.*

According to Rebinder [Kolloidnyi Zhurnal, 8, 157 (1946)], the dispersion of the disperse phase of an emulsion is effected by the spontaneous disintegration of drops which are stretched beyond a certain critical ratio $h/a = 2\pi$, where h is the height and r the radius of the base of the liquid cylinder. Mathematical analysis shows that, irrespective of the relative radii of the two resultant drops, the least favourable conditions for disintegration are when the ratio $\frac{2S_d}{S_c}$ (the sum of surfaces of the resultant drops divided by the surface of the cylinder) equals 2. Values below 2 favour the disintegration much more than those above 2. Hence the unstable condition of the cylindrical drop can be attained at small compression values. Finally, the disintegration occurs more readily for large values of the ratio S_d/S_c than for the smaller ones.

(B) V. LACHMAN

Ravdel, H. I.

✓ The limiting dimensions of the droplets in an emulsion. A. A. Ravdel and L. Ya. Kremnev (Leningrad Technol. Inst., Leningrad). *Doklady Akad. Nauk S.S.R.* 90, 599-602 (1953).—Coalescence of the droplets in an emulsion made mechanically of pure liquids, follows Smolukhovskii's equation: $\varphi - \varphi_0 = K r_K$, where φ and φ_0 are the initial and final volumes, resp., of a droplet; r_K is time, and K is the velocity const. of coagulation. $K = (4/3)(kT/\eta)$, where k is the Boltzmann const., T is abs. temp., and η is the viscosity of the dispersing medium (water). For a coned. emulsion of benzene in water at room temp., $K = 6.6 \times 10^{-10}$ cc./sec., and $r_K = 1.5 \times 10^4(\varphi - \varphi_0)$ sec. For droplets of radii 0.1, 1.0, 10, and 100 μ (the volumes are 3.3×10^{-11} , 3.3×10^{-12} , 3.3×10^{-9} , and 3.3×10^{-4} cc./droplet), r_K , the time for the vol. to increase 1000 times (by coalescence) is: 6×10^{-4} , 0.6 , 6×10^4 , and 6×10^6 sec., resp. For an emulsion contg. a surface-active stabilizer, such as soap, the authors derive an equation for r_p , starting with the Gibbs-Thomson equation for the adsorbed surface layer on the droplets. Their final equation is $r_p = (RT\gamma^2/6\pi MCD_0)(r_0^2 - r^2)$. For benzene and water, the surface tension γ is 35 dynes/cm., C_0 , the satd. concn. in the vol. of the dispersing medium is 7×10^{-4} g./cc. at $T = 20^\circ$, the coeff. of diffusion D of benzene into water is taken as 1 sq. cm./day. M and d are the mol. wt. and d. of the disperse phase. With these values, $r_p = 1.38 \times 10^4(r_0^2 - r^2)$ days. When $r = 0.1 r_0$, this formula gives the time taken for the droplet to decrease in size by 0.1%. This decrease is caused by diffusion, (which is taken as equiv. to the isothermal distn. of the droplets) which goes on even as the emulsion ages, with an eventual coarsening of the larger droplets. The above equation, when r_0 is 0.1, 1, 6, and 10μ , yields r_p , 0.12 sec., 1 min., 4 hrs. 10 min., and 1.38 days, resp. In other words, there are 2 ways by which emulsified droplets increase in size: (1) by coalescence, which, however, is hindered when a stabilizer covers the surface of the droplets, and (2) by aging of the emulsion, which is usually observed. V. H. Gottschalk

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The mechanism of emulsification. L. Ya. Kreinberg and A. A. Ravdel (Leningrad Technol. Inst., Leningrad). *Kolloid. Zhur.* 16, 17-23 (1954); cf. *C. I.* 46, 140316. A liquid cylinder (whose ratio of height to radius is k) spontaneously breaks into 2 spherical drops (whose radii are in the ratio $n:1$) when the total surface area of the drops is smaller than that of the cylinder, i.e. when $\beta = [3(n^4 + 1)/(1 + k)][3k/l(n^4 + 1)]^{1/2}$ is greater than 1. The drop formation is least probable when $k \approx 2$ and when $n \approx 1$; its probability is almost independent of n when $n < 0.2$ or $n > 6$. An ellipsoid (with axis ratio k) spontaneously gives 2 drops when $(n^4 + 1)/(n^4 + 1)^{1/2} K^{1/2} l > 1$ for prolate and $(n^4 + 1)K^{1/2}/(n^4 + 1)^{1/2} l > 1$ for oblate shape. Equations are given also for breakdown of an ellipsoid into many droplets and for successive sepn. of many small droplets from an ellipsoid. The inverse process of coalescence of small drops follows the Smoluchowsky theory; when the droplets are less than about 1μ in diam., their coalescence is more rapid than their formation; thus usual emulsions, both stabilized and unstabilized, contain chiefly particles of about 1μ . The aging of emulsions is due partly to soln. of small, and growth of large, particles; the time for particle radius r_0 to decrease to r is $RT\delta^2(r_0 - r)/6\sigma MDc$; δ , M , and c are d., mol. wt., and solv. of the disperse phase; σ = interfacial tension, and D = diffusion coeff. T. I. B.

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RMBINDER, P.A., akademik, otvetstvennyy redaktor; KREMLIN, L.Ya.,
redaktor izdatel'stva; GOREBLOM, M.A., redaktor izdatel'stva;
RAVDEK, A.A., redaktor izdatel'stva; KIRNARSKAYA, A.A., tekhniches-
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